



TECHNICAL UNIVERSITY OF MOMBASA

INSTITUTE OF COMPUTING AND INFORMATICS

DEPARTMENT OF COMPUTER SCIENCE & INFORMATION TECHNOLOGY

UNIVERSITY EXAMINATION FOR:

**BSC. MATHS AND COMPUTER SCIENCE AND BSC STATISTICS AND
COMPUTER SCIENCE**

EIT4317: SIMULATION AND MODELLING

END OF SEMESTER EXAMINATION

SERIES: APRIL 2016

TIME: 2 HOURS

DATE: Pick Date Apr 2016

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of Choose No questions. Attempt question ONE (Compulsory) and any other TWO questions.

Do not write on the question paper.

Question ONE

- a) explain factors that need to be considered when selecting a simulation software [8 Marks]
- b) explain the various simulation languages [6 marks]
- c) Write a Mat lab function program that calculates the sum of the squares of the first n Integers. [6 marks]
- d) Explain the benefits and limitations of using simulation to investigate business problems compared with the use of mathematical formulae [10 marks]
 - a. Model [1 mark]

Question TWO

Production line turns out about 50 trucks per day. Fluctuations in production occur for many reasons. The production can be described by a probability distribution as follows:-

Production /day	probability
45	0.03
46	0.05
47	0.07
48	0.10
49	0.15
50	0.20
51	0.15
52	0.10
53	0.07
54	0.05
55	0.03

Finished trucks are transported by train at the end of the day. The train capacity is only 51 trucks.

Required:

- a) Using the following random numbers, simulate the production for the next 10 days. [20 marks]
5,34,78,56,45,90,4,58,92,39,23

Question THREE

- a) Using a multiplicative congruently generator defined by $ZO=27$, $C=47$, $A=8$ AND $M=100$. Generate a sequence of 5 random numbers [5 marks]
- b) The following data are arrival (in minutes counting from 0) and service times(in minutes).for the first six customers arriving, a dental clinic with one dentist on duty, upon arrival a customer enters service if the dentist is free or joins the waiting line. When the dentist has finished work on a customer, the next one in line enters service.

Arrival time	12	31	63	95	99	154
Service time	40	32	55	48	18	50

RANDOM NUMBERS : 12,90,45,67,34,56,78,23,2,34

Required:

- I. Assuming a single server develop a simulation table [8 marks]
- II. Calculate the average waiting time for each customer[4 marks]
- III. Determine the idle time the dentist has [3 marks]

Question FOUR

- a) Create a mat lab program that will create the multiplication tables of any given number[6 marks]
- b) Explain the features that make MATLAB a good simulation software[6 marks]
- c) Explain the differences between a user defined function and built in function in mat lab. Give examples of built in functions in mat lab [8 marks]

Question FIVE

- a) Name four real world problems in business where simulation is applied and their solution methods (4marks)
- (b) Differentiate between stochastic model and deterministic model of system (6marks)
- (c) Explain seven stages in the model development process (10mark)